

# Ritual Combat in the Australian Copperhead, *Austrelaps superbus* (*Serpentes, Elapidae*)

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The copperhead (*Austrelaps superbus*) is a large (up to 1.5m) venomous terrestrial snake of south-eastern Australia. In this paper, we provide the first record and photographs of presumed male combat in this species. The observations were made 6 km south of the town of Mortlake, Victoria (142° 50' E 38° 05' S). The exact date was not recorded, but the observations were made in September or October 1978. Several observers watched the snakes; we thank Mr J. R. Allen for the photographs and description.

The snakes were first seen at about 1200 hrs, in a cleared pasture among tussock grass. The nearest permanent water was a man-made dam about 200m away. The snakes were entwined along the posterior parts of their bodies when initially sighted (Fig. 1). Both copperheads were large, about 1.5m in total length. They would lie quietly for a minute or two, and then move rapidly, writhing about and striking at each other. At these times, their heads would be raised up to 20cm off the ground. Although the snakes snapped at each other, no prolonged "chewing" bites were seen. Neither snake reacted to the approach of an observer within 3m. The posterior parts of the snakes remained

entwined during the entire period of observation (> 30 minutes). The snakes finally separated and moved away when they were pelted with stones by a group of people. No other copperheads were sighted in the vicinity of the two entwined snakes.

Although the snakes were not collected and sexed, we are confident that they were adult males in ritual combat. We base this interpretation on the body sizes of the snakes, as well as their behavior. Male copperheads grow to much larger body sizes than do females (Shine, 1978 a, b). The similarity in body sizes of the two "combatants" indicates that they were both of the same sex, and their large size suggests that both were males. Further, the postures adopted by the two snakes (Fig. 1) were similar to those seen in ritual combat between adult males of other elapid and colubrid species (e.g. Bogert and Roth 1966). The behavior of mating snakes is very different; both partners are passive during copulation, and their bodies are not entwined (e.g. Bogert and Roth 1966).

One unusual feature of *A. superbus* combat is the tendency for only the posterior parts of the bodies to be entwined; the heads of the snakes may be quite distant from each other (Fig. 1). This phenomenon has been reported previously in only one species, the Madagascan boa *Sanzinia madagascariensis* (Carpenter *et al.*, 1978). Entwining of only the posterior part of the body has been interpreted as an adaptation to arboreal combat in *Sanzinia* (Carpenter *et al.*, 1978), but the same hypothesis certainly cannot explain this behavior in *Austrelaps*. The copperhead is completely terrestrial.

Little information is available on reproduction in Victorian copperheads. Shine (1977 a, b) has described reproductive cycles in northern *A. superbus*, but Rawlinson (1974) suggested that this "highlands" form is a different species from the "lowlands"

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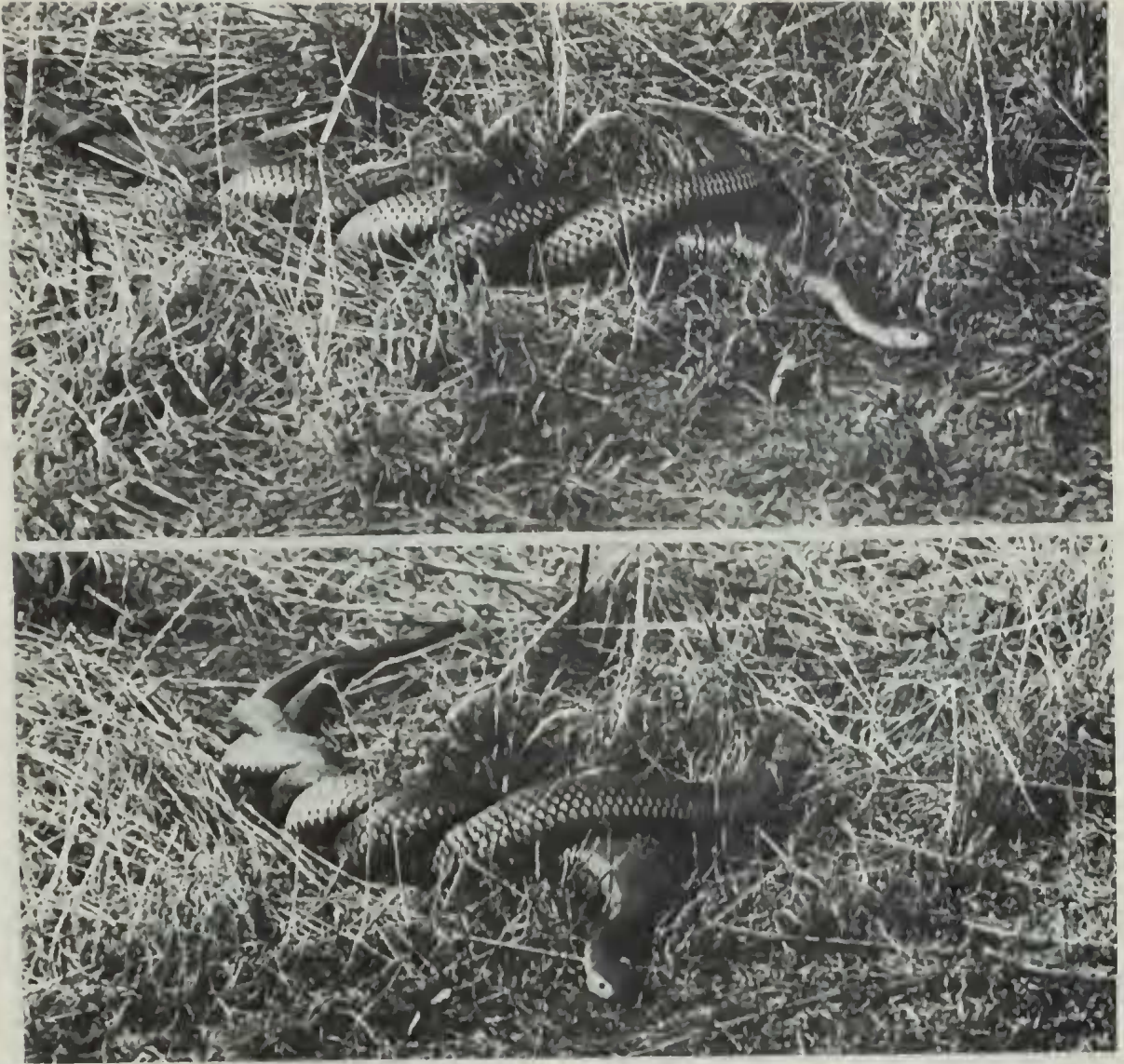


Fig. 1. Presumed male combat in the copperhead, *Austrelaps superbus*.

Victorian copperhead. The timing of the present record of male combat (September - October, the Australian spring) is consistent with the autumn and spring mating season of the "highlands" copperhead (Shine, 1977a). Male combat in snakes occurs most often during the mating season (Bogert and Roth 1966).

Ritual combat between males has now been documented in Australian snakes of the booid genera *Liasis* (Ross, 1978) and *Morelia* (Covacevich, 1975), and the elapid genera *Austrelaps* (present study), *Cryptophis* (N. Charles, pers. comm.), *Demansia* (Shine, unpublished

data), *Hemiaspis* (A. Easton, pers. comm.), *Notechis* (Shine 1977a), *Oxyuranus* (Hosmer, 1953, Worrell, 1963), *Pseudechis* (Fleay, 1937, 1951; Baker, 1968; Shine, 1977a, Shine *et al.*, unpublished data) and *Pseudonaja* (Fleay, 1937). Combat is more common, or at least more often noticed, in some species than in others. Combat bouts have been recorded more often in the common black snake (*Pseudechis porphyriacus*) than in other Australian elapids. For example, Fleay (1951) described black snake combat while noting that he had never seen male combat in either tiger snakes (*Notechis*



*scutatus*) or copperheads, two species with which he had great experience. Similarly, Shine (1977a) noted three cases of combat in New England black snakes, but none in tiger snakes or copperheads in the same area. Subsequent records of male combat in both *Notechis* and *Austrelaps* (Shine, 1977a; present paper) show that combat does occur in these species but is less common or less noticeable than in *Pseudechis porphyriacus*. Cases such as these suggest that male combat behavior may be much more widespread among the Australian snake fauna than is currently realized.

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## New Records of Scincid Lizards from Victoria

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Rawlinson (1971) listed the species of reptiles then known to occur in Victoria. Coventry (1976) described a new species of skink, *Hemiergis millewae*, from the far north west of the state. This article records the presence of two more species of skink in Victoria.

### 1. *Sphenomorphus kosciuskoi* Kinghorn, 1932. Alpine Water Skink. (Fig. 1).

#### Description:

A medium-sized lizard with a maximum snout-vent length of 80 mm (Cogger, 1979). Ground colour of back dark brown, with a prominent black vertebral stripe from the nape extending on to the tail. A pale dorsolateral stripe, edged above and below by black, from above

and behind the ear to the groin. Flanks lighter, speckled with black; belly light with dark flecks.

Sympatric species with which it is most likely to be confused are *Sphenomorphus tympanum* and *Leiopisma entrecasteauxii*. It can be distinguished from the former by the presence of the dark vertebral stripe and from the latter by its scaly lower eyelid. *S. tympanum* lacks the vertebral stripe and *L. entrecasteauxii* has a transparent window in the lower eyelid.

#### Distribution:

Cogger (1979), shows that the Alpine Water Skink occurs in a number of isolated populations, extending from the "Mt. Kosciusko region of the Australian Alps to northern tablelands of New South Wales".

The first Victorian specimens were collected from several localities on the

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